Migration Effects on Living Standards of the Left Behind. The Case of Overcrowding Levels in Ecuadorian Households

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Abstract: This paper reports an investigation of the effects of international migration on left-behind household overcrowding levels in Ecuador, a traditional migrating country. To do so, we use the universe of the Ecuadorian population collected in the Census of Population and Dwelling 2010. Using an instrumental variable regression model, we find a negative association between international migration and the overcrowding level of such household. Additionally, we verify the key role of remittances in order to ameliorate the overcrowding in the left-behind.

Key words: International migration, household overcrowding, Ecuador.
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1. Introduction

One of the targets within the UN's Millennium Development Goals is ensuring environmental sustainability, which includes the improvement of the quality of life of people by enhancing the quality of their dwellings. Among housing living conditions, overcrowding is an important constituent element of well-being. In addition, it is also significant as a deterrence factor in several domains of personal development: children in overcrowded households have a higher probability of getting illnesses that can interrupt their schooling (Edwards *et al*., 1994); a lack of privacy results in stress, impede social interactions, and create behavioural problems for all household members (Evans *et al.*, 1998). The way international migration affects overcrowding of the left-behind is the research question of this work.

Public policies are key drivers of the improvement of water sources and sanitation facilities, while private actors play a key role in achieving more durable or less crowded housing, an aspect that is recognised by the current housing policies in Latin America, such as the demand housing incentive system existing on Chile since 1978 and present in Ecuador since 1998 (Klaufus, 2010). The housing incentive system labelled ABC (*ahorro-bono-crédito*) played a role in several countries, including Ecuador. In order to access a dwelling the candidates needed some savings, what actually excluded too poor households. In any case, even if the policy provides free housing, a policy described for Colombia by Gilbert (2014), home ownership brings with it several expenses, including taxes, utility bills, etc., what, again, can be excessive for families with limited incomes.

Consequently it can be the case that external sources of income can become crucial to improve housing conditions. In this work we analyse the role of private actors and in particular how international migration and remittances impact on the improvement of housing in Ecuador, a developing country that experienced in the recent past both an

intense urbanization process and a wide international emigration episode. Rather than looking at the role of remittances in the development of modern villas, or as a driver of increasing housing prices, two aspects described in Ecuador by Klaufus (2010), we look at the improvement of basic housing conditions, and in particular housing overcrowding.

About 3% of the world's population live outside their country of birth. The majority of migration flows are from developing to developed countries: in the OECD, immigrants represent more than 12% of the total population (Royuela, 2015). The primary motive for emigrating is to achieve a better life, such as higher income, or a better work environment. Still, migration can also be seen as temporary, with the objective of accumulating savings to improve their standard of living on their return, including as specific goals buying a home or improving an existing one (Djajić and Vinogradova, 2015). In developing countries, housing improvements require substantial investments, which can be achieved either thanks to higher incomes driven by enhanced local economic growth, or to inflows of money from emigrants that send remittances home.

The literature is showing an increasing interest in the effects of migration on the households and countries left behind. Studies suggest that there are two main channels for identifying these effects. The first channel is direct, and includes family reunification (Brunner and Pate, 2016), the negative effects on the school attendance of children left-behind (Amuedo-Dorantes and Pozo, 2010), and a brain drain (Croix and Docquier, 2012; Ngoma and Ismail, 2013). The second channel is indirect, insofar as migrants interact with households left-behind by means of remittances.

In this paper, we study Ecuador, a small developing economy that experienced a massive migratory wave between the late 90s and early 2000s and with high levels of household overcrowding (INEC, 2010). We use the universe of the Ecuadorian

population, as collected in the 2010 census, to investigate the impact of international emigration on household overcrowding. Our findings show that, once endogeneity is accounted for, there is a significantly negative association between the presence of international migration and levels of overcrowding in the left-behind household. In other words, households with international migrants present lower levels of overcrowding levels in the households left behind. In addition we find indirect signals that the main channel of this association are the remittances.

The remainder of the paper is organized as follows: a review of the literature on household overcrowding, migration, and remittances is presented in section 2. Section 3 introduces the case study. The methodological approach is presented in section 4. Section 5 presents the main results together with sensitivity analyses and robustness checks. Section 6 concludes by summarizing the main findings and suggesting some policy recommendations.

2. Overcrowding and international emigration

A household is considered overcrowded when socially acceptable standards concerning the number of people per given area are surpassed. Such standards differ across countries and over time as economic conditions and social expectations change. Different conceptions of overcrowding therefore can be found since there appears to be no research identifying a single density of people per area at which everyone's health will be affected, or at which everyone will feel overcrowded (Jazwinski, 1998).

Household overcrowding, though, should not be confused with density. Overcrowding implies negative effects and is associated with a subjective perception, that is, the uncomfortable sense of being crowded in one's own household. Density, defined as number of individuals per given area (per room, per dwelling, per square meter, etc.),

is an objective measure which has no ready interpretation in normative terms (for instance, it is not clear that the lower the density the better). Household overcrowding generally refers to an individual's psychological response to density; to their feelings of being crowded, having a lack of privacy or an increase in unwanted interactions or psychological distress (Goux and Maurin, 2005; Gove *et al*., 1979).

The threshold at which density is considered to become overcrowding reflects the reality of each society: the British Bedroom Standard, the Canadian National Occupancy Standard, and the Equivalised Crowding Index (New Zealand) assume that there should be no more than two people per bedroom for a household not to be considered overcrowded. According to Koebel and Renneckar (2003), the optimal occupancy for a single room is 1.5 individuals in Western Europe and the USA. Outside this area, according to Edwards *et al.* (1994), attitudes about personal living space are complicated, and difficult to separate from cultural values. In the case of Latin American countries, several countries, including Ecuador, adopt the definition given by the Economic Commission for Latin America and the Caribbean (ECLAC): a household is overcrowded if there are more than three people per bedroom (PNUD, 2014).

Migration is likely to affect a household's housing and living conditions. Internal migration in developing countries is, today, associated with the explosion of large cities and the growth of urban slums (Banerjee *et al.*, 2012; Banerjee and Duflo, 2007), spaces characterized by the absence of basic services and household overcrowding. International migrations, on the other hand, may have other type of consequences. A massive migratory wave may result in the reduction of household overcrowding levels in these countries, as the numerator of the ratio is reduced. Yet, at the household level, it is likely that international emigration, because of high moving costs, only affects a limited number of family members, usually the householder (Stark and Lucas, 1988). This favours the

creation of extended families and, subsequently, a growth in overcrowding, usually as a result of the delegation of the care of the children left-behind (Rae-Espinoza, 2006), who move to the home of their aunties/uncles and/or grandparents. Suárez-Orozco and Suárez-Orozco (2009) note the high proportion of children left in the care of grandparents as a result of Ecuadorian migration in the late 90s. They point out that female migrants normally arrange substitute care before their departure. They also note that, when a female migrates, it may in fact divide the family. The paternal side may have very little involvement in the care of the children after the mother's migration and the maternal grandmother and aunts become the substitute family. The final structure of the household after the migration of one of its heads is unclear, and can be strongly influenced by the presence of children.[1]

Remittances may be an indirect channel via which migration influences overcrowding. Rahman and Fee (2014) claim that remittances are integral to migration, as one of a migrant's basic motives for migrating is to remit a portion of their earnings to his or her community of origin, especially in the case of a temporary labour migrant leaving their family behind. Here, Stark and Lucas (1988) note that the family may act as a cohesive team, in which every member's altruistic behaviour supports each other. The strength of this relationship makes it unnecessary to draw up a contract that guarantees remittances will be sent home (Sana and Massey, 2005).

We would expect to find considerable heterogeneity in the use of remittances in migration strategies. Adams (2009) finds that high-skilled migrants tend to remit less to labour-sending countries, and that low-skilled migrants tend to remit a higher share of their income. Similarly, income levels may also matter: remittances are a lifeline for poor

[1] This aspect has been noted by an external referee.

households (80% of total international remittances), and so they reduce vulnerability; whereas, more resilient households use a variable share of remittances to invest in human (education, health) and social (marriage) capital, and physical (livestock, housing, equipment) and financial assets (World Bank, 2015).

Adams and Cuecuecha (2010) find that remittances can increase investment in human and physical capital in receiving countries: households receiving remittances in Guatemala spend more at the margin on two investment goods – education and housing – than they would have spent on these goods without remittances. According to these authors, households treat remittances as transitory income, and consequently with a higher marginal propensity to save and invest. Households receiving international remittances spend 81% more at the margin on housing that they would spend on this good without the receipt of remittances. Moreover, Osili (2004) finds that, in the Philippines, a 10% increase in migrant income increases the probability of investing in housing by a mean of 3 percentage points in the country of origin. Boccagni (2014) develops a qualitative study on the migration-housing relationship focused on Ecuador, and finds that most of the emigrants' houses in the left-behind are *kin-inhabited* houses. He also points that building a new house, or significantly improving the past one, ranked very high among the perceived priorities of the Ecuadorian migrants. Klaufus (2010, 2012) recognizes the importance of international migration and remittances and the strong impact on local housing markets.

Consequently, migration could increase the incidence of overcrowding in the short-run due to family reunification after migration of one (or both) heads of the household. Nevertheless, in a longer period, overcrowding could decrease as remittances could increase housing investment of the left-behind, or as a result of the redefinition of the household structure. Due to data availability, as will be shown below, the results of our

work are more likely to capture medium and long run effects of migration on left-behind household overcrowding level.

3. The case of Ecuador

Ecuador is a small country (283,561 km² and 16 million inhabitants in 2017) lying on the north-west coast of South America. In 2010, the mean Ecuadorian household size was 3.8 people with 64% of its households lying in urban areas, a percentage share below the Latin American average. Politically and administrative speaking, Ecuador is divided in twenty four provinces, twenty three in the mainland (Coast, Highlands, Amazon) plus the Galápagos Islands. Each province is in turn made up of cantons (a total of 224) and each canton is formed by parishes (a total of 1,024). In recent decades, GDP per capita in Ecuador has presented a growing trend; so much so that according to the World Bank (2017) it is a medium-high level country. We use data for the universe of the Ecuadorian population collected in the 2010 Census of Population and Dwelling. This source includes up to 3,810,548 Ecuadorian households, representing a population of 14.4 M inhabitants.[2]

According to the definition of overcrowding provided by ECLAC (more than three people per bedroom), in 2010 17.5% of Ecuadorian households are overcrowded (Díaz and Romaní, 2016), presenting a decreasing tendency over time (34.5% in 1990 and 27% in 2001) (SIISE, n.d.). This statistic, though, is not homogenously distributed across the territory: overcrowding is more of a rural phenomenon than an urban issue: 64% (36%) of households live in urban (rural) areas, with 57% (43%) of overcrowded households living in these areas.[3]

[2] Our final estimations consider 3,770,535 households, after eliminating the households whose head is too old (1% older, over 85 years) or too young (below 14).
[3] Table A1 in the supplementary material reports the overcrowding and migration descriptive statistics at province level.

A good description of Ecuadorian migration is provided by Bertoli and Marchetta (2014), who stress that the country experienced an unprecedented wave of international migration, induced by a severe economic crisis, at the end of the 1990s.[4] Bertoli *et al.* (2011) indicate that, in the first years of the crisis (1998-2001), more than half a million Ecuadorians left the country. Ecuadorian migration was shaped by the combined effect of the crisis-induced liquidity constraints and the high migration costs that would-be Ecuadorian migrants faced, which were partly policy-induced (Bertoli *et al.*, 2011). The sorting was particularly important across destinations and dependent, above all, on the education and income levels of the population[5].

According to information from the 2010 Ecuadorian census, 4.9% of all Ecuadorian households (186,506) reported having at least one member that had migrated abroad in the ten years prior to data collection. In total, 290,064 people emigrated from these households in this period. Migration can be seen as being an urban-oriented phenomenon, given that 71.2% of the Ecuadorian households with international migrants are located in urban areas, while 28.8% are located in rural areas.

Of the households with international migrants, just 9.3% are overcrowded vs. a national average of 17.5%. Indeed, households with international migrants present a smaller overcrowding rate at the canton level (see Figure 1).

(Figure 1)

[4] Parandekar *et al.* (2002) report that the poverty headcount rose by an estimated 2 million people between the mid- and the late-1990s (in a country with a population of 12.7 million at that date).
[5] According to Herrera (2008), between 1998 and 2005, about 1.1 million Ecuadorians migrated internationally: 47% to Spain, 33% to the USA, 9.4% to Italy, 6% to other countries on the American continent, and 4.3% to other European countries. In Spain migrants received substantially lower income gains than in the US but where a bilateral visa waiver in force since 1963 reduced the monetary costs of migration (Bertoli *et al.*, 2013). Herrera (2008) briefly describes the recent international migration episodes of Ecuador, which averaged 20,000 persons per year between 1976 and 1990, a figure that doubled by 1998.

This growth in international migration has been accompanied by an increase in remittances. Between 2001 and 2010, remittances amounted to 23,769 M USD, representing on average about 5.4% of the Ecuadorean GDP in this period. According to the 2010 census 266,313 households received remittances over that year, what represents 7% of total households in the country.

4. Methodological approach

4.1. The model

As our data show, our key variables, overcrowding and international migration, are clearly related: overcrowding being less frequent in households with international migrants than is observed on average. What is not clear, though, is the direction of causality in this relationship and the selectivity of the processes involved. Is it in fact the case that migration reduces overcrowding? Or is it rather the case that less crowded households are the ones with a higher number of international migration episodes? Or simply that there are areas where every episode is more or less pronounced?

To address these questions, we have to consider the possibility of endogeneity in the relationship. Our empirical model comprises an instrumental variable regression in which overcrowding depends on migration, together with a large set of controls:

$$OC_i = \varphi + \beta X_i + \gamma Migration_i + u_i \quad (1)$$

Where:

OC_i is a measure proxying the concept of overcrowding in household *i*;

$Migration_i$ is a dummy variable that takes a value of 1 if at least one member of the household has migrated abroad in the ten-year period prior to data collection, or 0 otherwise;

X_i is a vector of control variables. It includes information about the householder, the dwelling, geographical characteristics, household structure and observable environmental factors;

u_i is the stochastic error term of the model.

We first approach overcrowding by means of a continuous measure, the number of people sharing a bedroom, as Solari and Mare (2012) do in their study of the effects of overcrowding on children's wellbeing. In this way, these authors consider that the effects of crowding on a child's wellbeing may begin to manifest themselves in a child when a high ratio of people per room is reached. Thus, a continuous measure enables to observe in greater detail the effects of migration on it.[6]

An alternative to the use of household is the use of dichotomous definition: a household is overcrowded if it has more than three individuals per bedroom. This implies the estimation of a probit model in which the dependent variable takes a value of 1 if the household is overcrowded and 0 otherwise. A final alternative estimation is to consider a scale of the degree of overcrowding; the dependent variable takes the values of 0 if the household is not overcrowded at all (0 to 3 people per bedroom or ppb), 1 if the overcrowding level is what we consider mild (3.1 to 4 ppb), 2 if it is moderate (4.1 to 5 ppb), 3 if it severe (5.01 to 6 ppb), and 4 if it is chronic (more than 6 ppb). In this case, the method to be considered is an ordered probit.

[6] We avoided the data trimming of household density, as our analysis is specifically devoted to look at the large values of this variable.

In this relationship endogeneity may arise as a result of an omitted variable problem. We seek to avoid this by employing a broad series of controls. In line with Painter and Yu (2010), who relate migration and overcrowding at the migrants' point of destination, we consider a list of demographic variables, including the householder's sex, age ethnic group, and marital status. We also consider education, which can also be considered as a proxy of income. We include the dwelling's tenancy regime, its location (urban/rural), and also province's fixed effects. Additionally, we contemplate the household structure: the proportion of both women and the elderly in the household.[7] We also consider that the immediate environment may have an effect on the probability of overcrowding, so we included the population density of the canton. The detailed description of these variables and the descriptive statistics are presented in the supplementary material.

A second potential source of endogeneity is reverse causality. We use two instruments to ameliorate this problem. The first instrument, refers to previous internal migration experience: the proportion of household heads (husband and/or wife) that were born in a different province from the one in which they currently live. This variable captures previous (internal) migration experiences, which may affect the decision to migrate abroad. A positive association might imply a sequential nature of migration spells (first national, then international). On the contrary, we interpret a negative association as a trade-off between these two options: any migration episode implies an important cost, which can only be spent once. The second instrument is the distance between the parish in which the household is located and the nearest international airport (Quito, Guayaquil, or Cuenca). The nearer the household is to an international airport, the easier it is to

[7] We have avoided including the presence of children as a control. This variable is strongly correlated with household size and consequently with overcrowding measures. When included, the over identification statistics were seriously affected. Following a referee suggestion considered the effect of this variable in the analysis. When separating the sample size among households with and without children, the main results hold.

emigrate. We expect that, having considered all the other controls, these two variables will not be correlated with the disturbance term of the main equation. In this regard, recall that we include the province's fixed effects and the population density of the canton, which must capture the vast share of the association between overcrowding and territorial characteristics. This leaves the distance to the nearest international airport with just residual importance, and as a variable with a greater influence on international migration than on overcrowding.

When considering dichotomous and the scale of overcrowding, in order to account for endogeneity we propose to use the conditional mixed-process methodological framework developed by Roodman (2011). This enables us to jointly estimate two or more equations with linkages between their error processes, what in our case we use to instrument migration. This model is essentially one of seemingly unrelated regressions, albeit in a much broader sense, as the individual equations need not be classical regressions with a continuous dependent variable (Roodman, 2011).

5. Results

5.1. Basic results

Table 1 shows our OLS results. We find that international migration is negatively associated with the level of household density. The estimated coefficients of migration are statistically significant at the 1% level of significance. The estimated coefficient in column (1) indicates that a household with international migrant members has 0.5 fewer individuals per bedroom than a household without migrants. The sign and significance of international migration persist even after controlling for other observables of household density (columns 2 to 4), although the parameter is halved, which we interpret to be evidence of important selectivity.

(Table 1)

Instrumental variable estimates are presented in Table 2; column (1) shows the first-stage estimates. The instruments considered have significant negative effects on international migration. Both the test of excluded instruments and the test of weak instruments reject the null hypothesis of no significance.

The IV estimate of the effect of international migration on overcrowding is also negative and statistically significant at the 5% level (column 2), while the instruments pass the overidentification tests, which implies that at some point we are able to ameliorate the reverse causality. These results suggest that a household with international migrant members is associated with a significant improvement in living conditions. The parameter estimate, that is -0.704, is higher than that obtained in the OLS estimate (-0.25). We interpret this difference as being an indication that the reverse causality between overcrowding and migration is positive: in other words, the higher the level of a households' overcrowding, the greater the members' willingness to migrate. Bearing in mind that household overcrowding is a dimension of poverty, it may be the case that they find themselves stuck in some sort of poverty trap: they might not migrate because they do not have sufficient resources to move abroad; yet, at the same time, they might not have sufficient financial resources because there are no migrant members in their households helping them pay for their travel expenses.

(Table 2)

The results of robustness regressions are presented in columns (3) and (4) of Table 2. In both estimations, we obtain negative and statistically significant estimated parameters for international migration. The probit specification indicates that if a household reports having international migrant, it is less likely to present overcrowding than a household

that does not report having international migrants, *ceteris paribus.* In the ordered probit specification, the negative sign suggests that a household with migrant members is more likely to be in the lower categories. Clearly, both robustness checks are in line with our basic regression findings.

5.2. The impact of remittances on the overcrowding-international migration relationship

In the 2010 census, 266,313 households reported receiving remittances. In addition, 186,506 households reported that at least one member had migrated abroad since the last census was conducted (2001). This difference can be attributed to those migrants that left the country before 2001. Additionally, just 82,228 households declared that a member had emigrated in the period 2001-2010 and that they were receiving remittances from abroad. This means that over 100,000 households with a recent international migrant are not receiving remittances.

In earlier sections herein, we have argued that remittances operate as a key channel of transmission between migration and overcrowding, mostly on a medium and long run dimension. We admit that we have no evidence at all on how these remittances are being spent, or if they are indeed devoted to improve housing conditions. We also do not know the amount of remittances for every household. What we do know is that all households receiving remittances have in common the fact that a family member has emigrated abroad at some point. Consequently, we hypothesize that if a household is indeed receiving remittances, having a recent international migrant may not affect overcrowding of the left-behind. Similarly, if there are no remittances at all, the fact of having an international migrant is not expected to influence overcrowding.

A final problem to analyse the role of remittances is that they are likely to be an endogenous explanatory variable, we follow an indirect procedure: to verify the role of remittances, we run our basic model on two sub-samples, shown in Table 3. Columns (1), (2), and (3) show, respectively, the OLS, first-stage, and IV estimates of those households receiving remittances in 2010; while, columns (4), (5), and (6) present the same information for households not receiving remittances.

In these regressions, we assume that households receiving remittances have a relative who migrated in the past. Consequently, the migration variable is simply an indication that a household member has migrated in the previous ten years. Column (1) presents a negative and significant parameter, what implies that a household with a recent international migrant has less overcrowding. Still, the IV regression (column 3), does not report a significant result. The fact that the instruments are not clearly exogenous for this subsample (we reject the null of the Hansen test at 5%) and the fact that the parameter is not precisely estimated, do not allow to say that recent international migration helps to reduce overcrowding in housing with remittances.

As for those households that do not receive remittances, the estimated parameter of the international migration is once again not statistically significant in the IV regression. This suggests that even if the household has a recent migrant, if he/she does not send remittances, those left-behind do not enjoy any significant improvement in their levels of overcrowding. In all cases, the estimated parameters are far lower than the one found in the overall sample.

In our view, these results suggest that the role of international migration on improving the overcrowding of the left-behind cannot be confirmed once we account for the existence of remittances. Besides, the strong decline in the point estimates of the

parameters when compared with the overall sample (both OLS and IV), is a further indication of the importance of remittances. We think that this is an indirect evidence of the role played by remittances in the association between international migration and the material well-being of the households left behind.

(Table 3)

6. Discussion and conclusion

In this paper, we have analysed the effects of migration on the levels of overcrowding in the households left behind. Using information from the 2010 census conducted in Ecuador, a small developing economy that experienced a massive migratory wave between the late 1990s and early 2000s and with high levels of household overcrowding, we have estimated an instrumental variable model. It seems to be confirmed that international migration is associated with a reduction in the levels of overcrowding in the households left behind.

Our results point to a positive reverse causality between overcrowding and migration, that is, the higher the overcrowding (or poverty) level is in the origin country, the greater the willingness to emigrate. By considering alternative subsamples of households (those receiving and not receiving remittances), we find that even if the household has a recent migrant, if he/she does not send remittances, the left-behind household does not present a statistically significant improvement in terms of a reduction in its level of overcrowding.

Once assumed the role of remittances on the improvement of the living conditions of the left-behind, we can infer that remittances has a strong altruistic component. We assume that the arguments proposed by Rahman and Fee (2014) are true: a migrant's basic motives is to remit a portion of their earnings to the left-behind. From a public policy perspective, a good way to improve the living conditions of citizens in developing

countries is to maintain the link with the origin community, and to facilitate the conversion of remittances from abroad into housing investments, as improvements to living quarters represent the first step towards improving quality of life and human capital accumulation. Such policies are already taking place under the auspices of the World Bank and aid agencies. Zapata (2018) describes the Colombian's effort to incorporate migrants as agents of development, and concludes that the impact of the implemented programmes has been modest.

Future research can usefully be targeted at isolating the effect of other channels via which migration might impact overcrowding, such as the role of family reunification, as well as the effects of migration on other measures of material and psychological well-being.

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Tables

Table 1. OLS results

	(1)	(2)	(3)	(4)
International migration	-0.496***	-0.415***	-0.283***	-0.252***
	(0.00363)	(0.00357)	(0.00329)	(0.00326)
Sex householder (Male=1)			-0.0229***	-0.0250***
			(0.00217)	(0.00215)
Age householder			-0.00290***	-0.00336***
			(0.000297)	(0.000294)
Age^2 householder			-9.24e-05***	-8.70e-05***
			(3.24e-06)	(3.20e-06)
Years of schooling			-0.0669***	-0.0651***
			(0.000151)	(0.000157)
Proportion women			0.273***	0.305***
			(0.00318)	(0.00315)
Proportion elderly			-0.850***	-0.815***
			(0.00439)	(0.00435)
Ethnics			Yes	Yes
Marital status			Yes	Yes
Regime of tenancy			Yes	Yes
Area (Urban=1)		-0.330***		-0.0734***
		(0.00177)		(0.00175)
Canton density		-3.57e-05***		-8.37e-06***
		(2.75e-06)		(2.51e-06)
Province fixed effects		Yes		Yes
R-squared	0.005	0.046	0.194	0.212
Observations	3,770,535	3,770,535	3,770,535	3,770,535

Note: Robust (heteroskedasticity adjusted) standard errors are in parentheses. ***, **, * denote significance at 1%, 5% and 10% levels, respectively. For full estimation report, see Table A4 in supplementary material.

Table 2. IV results and robustness checks

	(1) First stage	(2) 2SLS	(3) (OC = 0,1)	(4) (OC = 0,1,2,3,4)
Airport distance	-0.0000897***			
	(4.26e-06)			
Proport. internal migrant	-0.00596***			
	(0.0003437)			
International Migration		-0.704***	-0.496***	-0.366***
		(0.270)	(0.043)	(0.014)
Number of observations	3,770,535	3,770,535	3,770,535	3,770,535
F test excluded instruments				
F (2, 3770535) [p-val]		352.79 [0.0000]		
Weak id F		321.153		
Hansen J statistics [p-val]		2.054 [0.1518]		
Wald $chi^2(103)$ [p-val]			499430.40 [0.000]	515847.25 [0.000]
Log pseudolikelihood			-2207354.1	-3000694.6

Note: the estimates include household controls (gender, age, education, ethnicity, marital status, regime of tenancy, area of residence, household characteristics, canton density and province fixed effects. Robust (heteroskedasticity adjusted) standard errors are in parentheses. ***, **, * denote significance at 1%, 5% and 10% levels, respectively. For full estimation report see Table A5 in the supplementary material.

Table 3. Estimation results for households receiving and not receiving remittances

	Receiving remittances			Not receiving remittances		
	(1)	(2)	(3)	(4)	(5)	(6)
	OLS	First-stage	2SLS	OLS	First-stage	2SLS
Airport distance		-0.0001615***			-0.0000379***	
		(0.0000427)			(3.43e-06)	
Proportion internal migrant		-0.03369***			-0.00104***	
		(0.00289)			(0.00029)	
International Migration	-0.101***		-0.278	-0.215***		-0.246
	(0.00481)		(0.212)	(0.00434)		(0.852)
Number of observations	264,183	264,183	264,183	3,506,352	3,506,352	3,506,352
R^2	0.151		0.147	0.212		0.2120
Excluded Inst. F (2, 264130) [p-val]			75.07 [0.000]			
Excluded Inst. F (2, 3506299) [p-val]						65.38 [0.000]
Weak id F			75.07			65.38
Hansen J statistics [p-val]			4.277 [0.0386]			1.023 [0.3119]

Note: the estimates include household controls (gender, age, education, ethnicity, marital status, regime of tenancy, area of residence, household characteristics, canton density and province fixed effects. Robust (heteroskedasticity adjusted) standard errors are in parentheses. ***, **, * denote significance at 1%, 5% and 10% levels, respectively. For full estimation report, see Table A6 in the supplementary material.